

What is claimed is:

1. A video data compression apparatus comprising:  
an indicator data calculating means for  
calculating indicator data indicating a complexity of  
5 video data for every picture from noncompressed video  
data;  
a target value calculating means for  
calculating a target value of an amount of data after  
compression of said video data for every picture based on  
10 said calculated indicator data; and  
a compressing means for compressing said  
noncompressed video data so that the amount of data after  
compression becomes said calculated target value.
2. A video data compression apparatus according to  
15 claim 1, wherein:  
said compressing means compresses said video  
data to a picture type sequence containing a plurality of  
types of pictures (I picture, P picture, and B picture or  
a combination of them) in a predetermined order;  
20 said indicator data calculating means  
calculates an ME residual as said indicator data of the  
pictures to be compressed to the P picture and B picture  
and calculates a flatness and an intra AC data or one of  
the same as said indicator data of a picture to be  
25 compressed to an I picture; and

said target value calculating means calculates difficulty data corresponding to the amount of data after compression based on said calculated indicator data and further calculates said target value based on the  
5 calculated difficulty data.

3. A video data compression apparatus according to claim 1, wherein:

said indicator data calculating means calculates an activity as said indicator data of the I  
10 picture of said video data.

4. A video data compression apparatus according to claim 1, further comprising

a delaying means for delaying said video data for a predetermined time and then outputting the same;

15 said target value calculating means calculates said target value with respect to a picture output by said delaying means based on said indicator data calculated during a period where said delaying means delays said video data; and

20 said compressing means compresses pictures output by said delaying means so that the amount of data after compression becomes said calculated target value.

5. A data compression method comprising the steps of:

25 calculating indicator data indicating a

complexity of video data for every picture from  
noncompressed video data;

calculating a target value of an amount of data  
after compression of said video data for every picture  
5 based on said calculated indicator data; and

compressing said video data by a predetermined  
compression method so that the amount of data after  
compression becomes said calculated target value.

6. A video data compression method according to  
10 claim 5, wherein:

said compressing step compresses said video  
data to a picture type sequence containing a plurality of  
types of pictures (I picture, P picture, and B picture or  
a combination of the same) in a predetermined order;

15 said indicator data calculating step calculates  
an ME residual as said indicator data of pictures to be  
compressed to a P picture and B picture and calculates a  
flatness and intra AC data or one of the same as said  
indicator data of a picture to be compressed to an I  
20 picture;

said data amount target value calculating step  
further has a step for calculating difficulty data  
corresponding to the amount of data after compression  
based on said calculated indicator data; and

25 said target value is calculated based on the

calculated difficulty data.

7. A video data compression method according to claim 5, wherein:

5 said indicator data calculating step calculates an activity as said indicator data of the I picture of said video data.

8. A video data compression method according to claim 5, wherein:

10 it further comprises a step of delaying said video data by a predetermined time and then outputting the same;

said data amount target value calculating step calculates said target value with respect to a picture delayed and output based on said indicator data  
15 calculated during a period where said video data is delayed; and

said compression step compresses the delayed and output picture so that the amount of data after compression becomes said calculated target value.

20 9. A video data compression apparatus comprising:

an indicator data calculating means for calculating indicator data indicating a complexity of video data for every picture;

25 a difficulty data calculating means for performing a predetermined computation processing for

multiplying a coefficient with said calculated indicator data to calculate difficulty data corresponding to the amount of data after compression of said video data;

a target value calculating means for

- 5 calculating a target value of the amount of data after compression of said video data for every picture based on said calculated difficulty data;

a compressing means for compressing each of the pictures of said video data by a predetermined

- 10 compression method so that the amount of data after compression becomes said calculated target value so as to generate compressed video data; and

a coefficient updating means for updating said coefficient based on the amount of data of the generated

- 15 compressed video data.

10. A video data compression apparatus according to claim 9, wherein:

said compressing means compresses said

noncompressed video data to a picture type sequence

- 20 containing a plurality of types of pictures (I picture, P picture, and B picture or combination of the same) in a predetermined order; and

said indicator data calculating means

calculates an ME residual as said indicator data of

- 25 pictures to be compressed to a P picture and B picture

and calculates a flatness, intra AC data, and activity or a combination of the same as said indicator data of a picture to be compressed to an I picture.

11. A video data compression apparatus according to  
5 claim 10, wherein:

said compressing means has

a quantizing means for quantizing said video data by a quantization value set from an external unit so as to generate said compressed video data and

10 a quantization value adjusting and setting means for successively adjusting said quantization value based on said calculated target value and setting the same in said quantizing means; and

said coefficient updating means updates said  
15 coefficient based on an average value of said quantization values set in said quantizing means of said compressing means, an amount of data of said generated compressed video data, and said calculated indicator data.

12. A video data compression apparatus according to  
20 claim 11, wherein

said coefficient updating means has:

a global complexity calculating means for calculating a global complexity based on the average value of said quantization values set in said quantizing  
25 means of said compressing means and the amount of data of

said generated compressed video data and

a coefficient calculating means for calculating  
said coefficient based on said calculated global  
complexity and said indicator data.

5           13. A video data compression apparatus according to  
claim 12, wherein:

          said coefficient calculating means divides the  
global complexity of a picture which becomes an I picture  
after compression by said generated flatness, intra AC,  
10 or activity to calculate said coefficient for an I  
picture and divides the global complexity of a picture  
which become a P picture or a B picture after compression  
by said generated ME residual to calculate said  
coefficient for a P picture and said coefficient for a B  
15 picture.

          14. A video data compression apparatus according to  
claim 13, wherein:

          said coefficient calculating means adds or  
subtracts a predetermined offset value with respect to  
20 said global complexity and divides the result by said  
generated flatness, intra AC, or activity to calculate  
said coefficient for an I picture and divides the global  
complexity of a picture which becomes a P picture or a B  
picture after compression by said generated ME residual  
25 to calculate said coefficient for a P picture and said

coefficient for a B picture.

15. A video data compression method comprising the steps of:

- calculating indicator data indicating a
- 5 complexity of video data for every picture;
- performing predetermined computation processing for multiplying a coefficient with said calculated indicator data to calculate difficulty data corresponding to the amount of data after compression;
- 10 calculating a target value of the amount of data after compression of said noncompressed video data for every picture based on said calculated difficulty data;
- compressing each of the pictures of said video
- 15 data by the compression method so that the amount of data after compression becomes said calculated target value so as to generate compressed video data; and
- updating said coefficient based on the amount of data of the generated compressed video data.

20 16. A video data compression method according to claim 15, wherein:

- said compressing step compresses said video data to a picture type sequence containing a plurality of types of pictures (I picture, P picture, and B picture or
- 25 combination of the same) in a predetermined order; and



said indicator data calculating step calculates an ME residual as said indicator data of pictures to be compressed to a P picture and B picture and calculates a flatness, intra AC data, and activity or a combination of the same as said indicator data of a picture to be compressed to an I picture.

17. A video data compression method according to claim 16, wherein:

said compressing step further contains  
a step of quantizing the video data subjected to said predetermined compression processing by a quantization value set from an external unit so as to generate said compressed video data and

a step of successively adjusting and setting said quantization value based on said calculated target value; and

said updating step updates said coefficient based on an average value of said adjusted and set quantization values, the amount of data of said generated compressed video data, and said calculated indicator data.

18. A video data compression method according to claim 17, wherein:

said updating step  
calculates a global complexity based on the average value of said adjusted and set quantization

values and the amount of data of said generated  
compressed video data and

calculates said coefficient based on said  
calculated global complexity and said indicator data.

5        19. A video data compression method according to  
claim 18, wherein:

          said updating step divides the global  
complexity of a picture which becomes an I picture after  
compression by said generated flatness, intra AC, or  
10 activity to calculate a coefficient for the I picture and  
divides the global complexity of a picture which becomes  
a P picture or a B picture after compression by said  
generated ME residual to calculate said coefficient for a  
P picture and said coefficient for a B picture.

15        20. A video data compression method according to  
claim 19, wherein:

          said updating step adds or subtracts a  
predetermined offset value with respect to said global  
complexity and divides the result by said generated  
20 flatness, intra AC, or activity to calculate said  
coefficient for an I picture and divides the global  
complexity of a picture which becomes a P picture or a B  
picture after compression by said generated ME residual  
to calculate said coefficient for a P picture and said  
25 coefficient for a B picture.

21. A video data compression apparatus for  
compressing a continuous plurality of video data to  
compressed video data of a picture type sequence containing  
a plurality of types of pictures (I picture, P picture,  
5 and B picture) in a predetermined order, comprising:

a rearranging means for rearranging pictures of  
said noncompressed video data to an order adapted to the  
compression method so that each head picture of said  
video data becomes an I picture or a P picture;

10 an indicator data calculating means for  
calculating indicator data indicating a complexity of  
said rearranged noncompressed video data for every picture;

a border detecting means for detecting a scene  
change of a continuous plurality of said noncompressed  
15 video data;

a changing means for changing said picture type  
sequence so that pictures of any of said noncompressed  
video data are compressed without reference to the  
pictures of said other noncompressed video data for every  
20 border of a detected scene change;

a target value calculating means for  
calculating a target value of the amount of data after  
compression of said video data based on said calculated  
indicator data and said picture type sequence after  
25 change; and

a compressing means for compressing said video data to compressed video data of said picture type sequence after change so that the amount of data after compression becomes substantially said calculated target value.

22. A video data compression apparatus according to claim 21, wherein:

said target value calculating means has an approximating means for performing predetermined computation processing for multiplying a coefficient with said calculated indicator data to calculate difficulty data corresponding to the amount of data after compression and

a calculating means for calculating a target of the amount of data after compression of said noncompressed video data for every picture based on said calculated difficulty data;

said compressing means has a quantizing means for quantizing said video data by a quantization value set from an external unit so as to generate said compressed video data and

a quantization value adjusting and setting means for successively adjusting said quantization values based on said calculated target value and setting the same in said quantizing means; and

provision is further made of a coefficient  
updating means for updating said coefficient based on the  
average value of said quantization values set in said  
quantizing means of said compressing means, the amount of  
5 data of said generated compressed video data, and said  
calculated indicator data.

23. A video data compression apparatus according to  
claim 21, wherein

said target value calculating means has:

10 a predictive target amount calculating means  
for calculating said target value in accordance with the  
type of picture after compression by predicting that  
pictures contained in the predetermined compression unit  
are compressed as an order of said picture type sequence  
15 in advance before the change of said picture type  
sequence and

a target amount correcting means for correcting  
said target value of a picture of said video data of a  
type of picture which after compression is changed in  
20 accordance with the type of the picture after the change  
in only a case where a change of said picture type  
sequence actually exists.

24. A video data compression apparatus according to  
claim 23, wherein:

25 said indicator data calculating means

calculates a flatness, intra AC, and activity as  
indicator data of a picture which becomes an I picture  
after compression and an ME residual as indicator data of  
a picture which becomes a P picture or a B picture after  
5 compression;

said changing means changes said picture type  
sequence so that the picture of the head of said video  
data is compressed to an I picture when the picture of  
the head of said video data would be compressed to a P  
10 picture; and

said target amount correcting means corrects  
said target value of a picture of a type of picture after  
compression which changes from a P picture to an I  
picture, which is calculated in advance, to said target  
15 amount of a picture in a case where it becomes an I  
picture after compression and corrects said target value  
of a picture of a type of the picture after compression  
which changes from an I picture to a P picture, which is  
calculated in advance, to said target amount of a picture  
20 in a case where it becomes a P picture after compression.

25. A video data compression apparatus according to  
claim 22, wherein

said coefficient updating means has  
a global complexity calculating means for  
25 calculating a global complexity based on an average value

of said quantization values set in said quantizing means  
of said compressing means and the amount of data of said  
generated compressed video data and

a coefficient calculating means for calculating  
5 a coefficient based on said calculated global complexity  
and said indicator data.

26. A video data compression apparatus according to  
claim 25, wherein:

said coefficient calculating means divides a  
10 global complexity of a picture which becomes an I picture  
after compression by said generated flatness, intra AC,  
or activity to calculate a coefficient for an I picture  
and divides a global complexity of a picture which  
becomes a P picture or a B picture after compression by  
15 said generated ME residual to calculate a coefficient for  
a P picture or a coefficient for a B picture.

27. A video data compression method for compressing  
a continuous plurality of video data to compressed video  
data of a picture type sequence containing a plurality of  
20 types of pictures (I picture, P picture, and B picture)  
in a predetermined order, comprising the steps of:

rearranging pictures of said noncompressed  
video data to an order adapted to the compression method  
so that each head picture of said video data becomes an I  
25 picture or a P picture;

calculating indicator data indicating a complexity of said rearranged noncompressed video data for every picture;

detecting a scene change of the continuous plurality of said noncompressed video data;

changing said picture type sequence so that a picture of any of said noncompressed video data is compressed without reference to a pictures of other noncompressed video data for every border of a detected scene change;

calculating a target value of the amount of data after compression of said video data for every predetermined compression unit based on said calculated indicator data and said picture type sequence after change; and

compressing said video data to the compressed video data of said picture type sequence after change so that the amount of data after compression becomes substantially said calculated target value.

28. A video data compression method according to claim 27, wherein:

said target value calculating step performs predetermined computation processing for multiplying a coefficient with said calculated indicator data so as to calculate difficulty data corresponding to the amount of



data after compression and

calculates a target of the amount of data after compression of said noncompressed video data for every picture based on said calculated difficulty data;

5           said compressing step quantizes video data subjected to said predetermined compression processing by a quantization value set from an external unit so as to generates said compressed video data and

                  successively adjusts said quantization value  
10 based on said calculated target value and sets the same; and

                  said predetermined coefficient is updated based on the average value of said set quantization values, the amount of data of said generated compressed video data,  
15 and said calculated indicator data.

29. A video data compression method according to claim 27, wherein

                  said target value calculating step calculates said target value in accordance with the type of picture  
20 after compression by predicting that pictures contained in said predetermined compression unit are compressed as an order of said picture type sequence in advance before the change of said picture type sequence and

                  corrects said target value of the picture of  
25 said noncompressed video data of a type of picture which

after compression is changed in accordance with the type of the picture after the change in only a case where a change of said picture type sequence actually exists.

30. A video data compression method according to  
5 claim 29, wherein:

said indicator data calculating step calculates a flatness, intra AC, and activity as indicator data of a picture which becomes an I picture after compression and an ME residual as indicator data of a picture which  
10 becomes a P picture or a B picture after compression;

changes said picture type sequence so that the picture of the head of said video data is compressed to an I picture where the picture of the head of said video data would be compressed to a P picture; and

15 corrects said target value of a picture of a type of picture after compression which is changed from a P picture to an I picture, which is calculated in advance, to said target amount of a picture in the case where it becomes an I picture after compression and  
20 corrects said target value of a picture of a type of picture after compression which is changed from an I picture to a P picture, which is calculated in advance, to said target amount of a picture in the case where it becomes a P picture after compression.

25 31. A video data compression method according to

claim 28, wherein

said coefficient updating step calculates a  
global complexity based on the average value of said  
quantization values to be set and the amount of data of  
5 said generated compressed video data and

calculates said coefficient based on said  
calculated global complexity and said indicator data.

32. A video data compression method according to  
claim 31, wherein:

10 said coefficient calculating step divides a  
global complexity of a picture which becomes an I picture  
after compression by said generated flatness, intra AC, or  
activity to calculate said coefficient for an I picture  
and divides a global complexity of a picture which  
15 becomes a P picture or a B picture after compression by  
said generated ME residual to calculate said coefficient  
for a P picture or said coefficient for a B picture.